US009066199B2

(12) **United States Patent**
Forstall et al.

(10) **Patent No.: US 9,066,199 B2**
(45) **Date of Patent: Jun. 23, 2015**

(54) **LOCATION-AWARE MOBILE DEVICE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1044 days.

(21) Appl. No.: **12/163,858**

(22) Filed: **Jun. 27, 2008**

(65) **Prior Publication Data**

US 2009/0005080 A1 Jan. 1, 2009

Related U.S. Application Data

(60) Provisional application No. 60/946,774, filed on Jun. 28, 2007.

(51) **Int. Cl.**

H04W 24/00	(2009.01)
H04W 4/02	(2009.01)
H04L 29/08	(2006.01)

(52) **U.S. Cl.**

CPC ***H04W 4/02*** (2013.01); ***H04L 67/18*** (2013.01)

(58) **Field of Classification Search**

USPC 455/456.1–456.6

See application file for complete search history.

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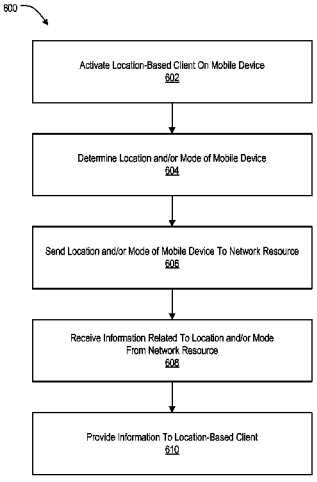
(57) **ABSTRACT**

One or more location-based clients can be activated on a mobile device for providing location-based services. The location-based clients can be provided with information (e.g., presets, defaults) related to the current location and/or mode of the mobile device. The information can be obtained from one or more network resources. In some implementations, a number of location-based clients can run concurrently on the mobile device and share information.

37 Claims, 6 Drawing Sheets



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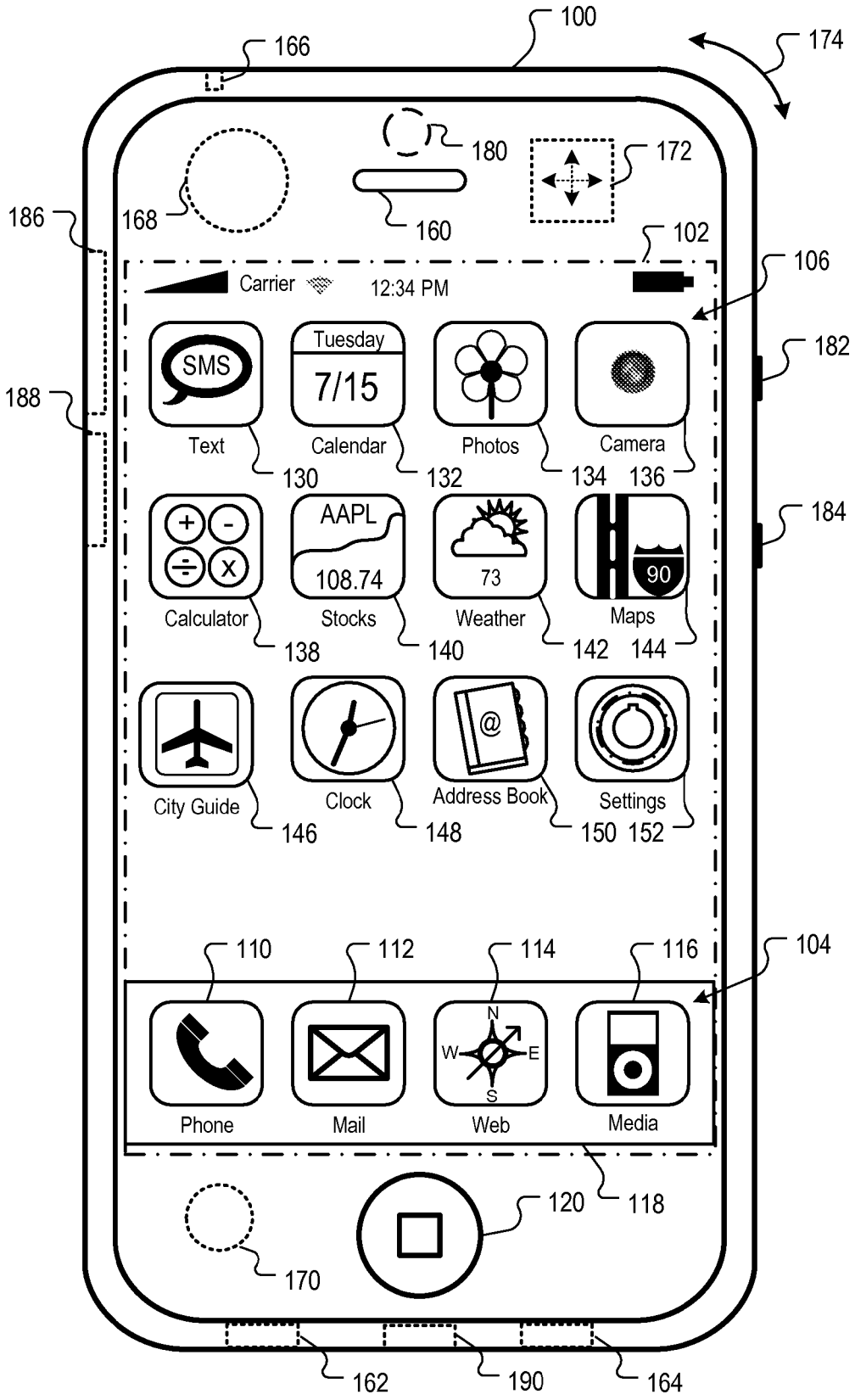
100
166
174
180
172
168
160
186
102
106
Carrier
12:34 PM
182
188
SMS
Tuesday
7/15
Text
Calendar
Photos
Camera
130
132
134
136
184
AAPL
108.74
73
90
Calculator
Stocks
Weather
Maps
138
140
142
144
City Guide
Clock
Address Book
Settings
146
148
150
152
110
112
114
116
104
N
W
E
S
Phone
Mail
Web
Media
118
120
170
162
190
164

FIG. 1

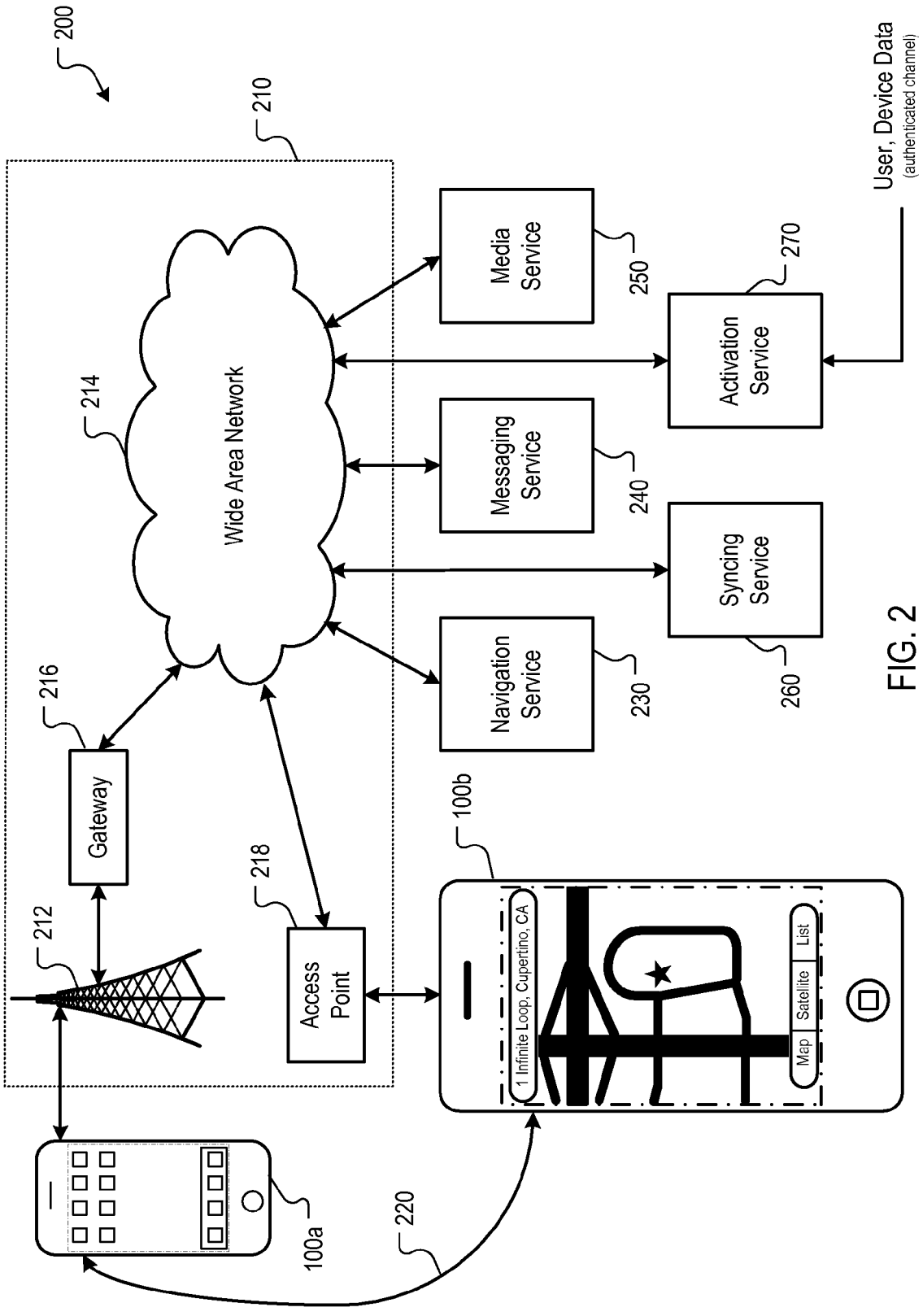
200
210
214
Wide Area Network
216
Gateway
212
218
Access Point
Media Service
250
Messaging Service
240
Navigation Service
230
Syncing Service
260
Activation Service
270
User, Device Data
(authenticated channel)
100b
1 Infinite Loop, Cupertino, CA
Map
Satellite
List
100a
220

FIG. 2

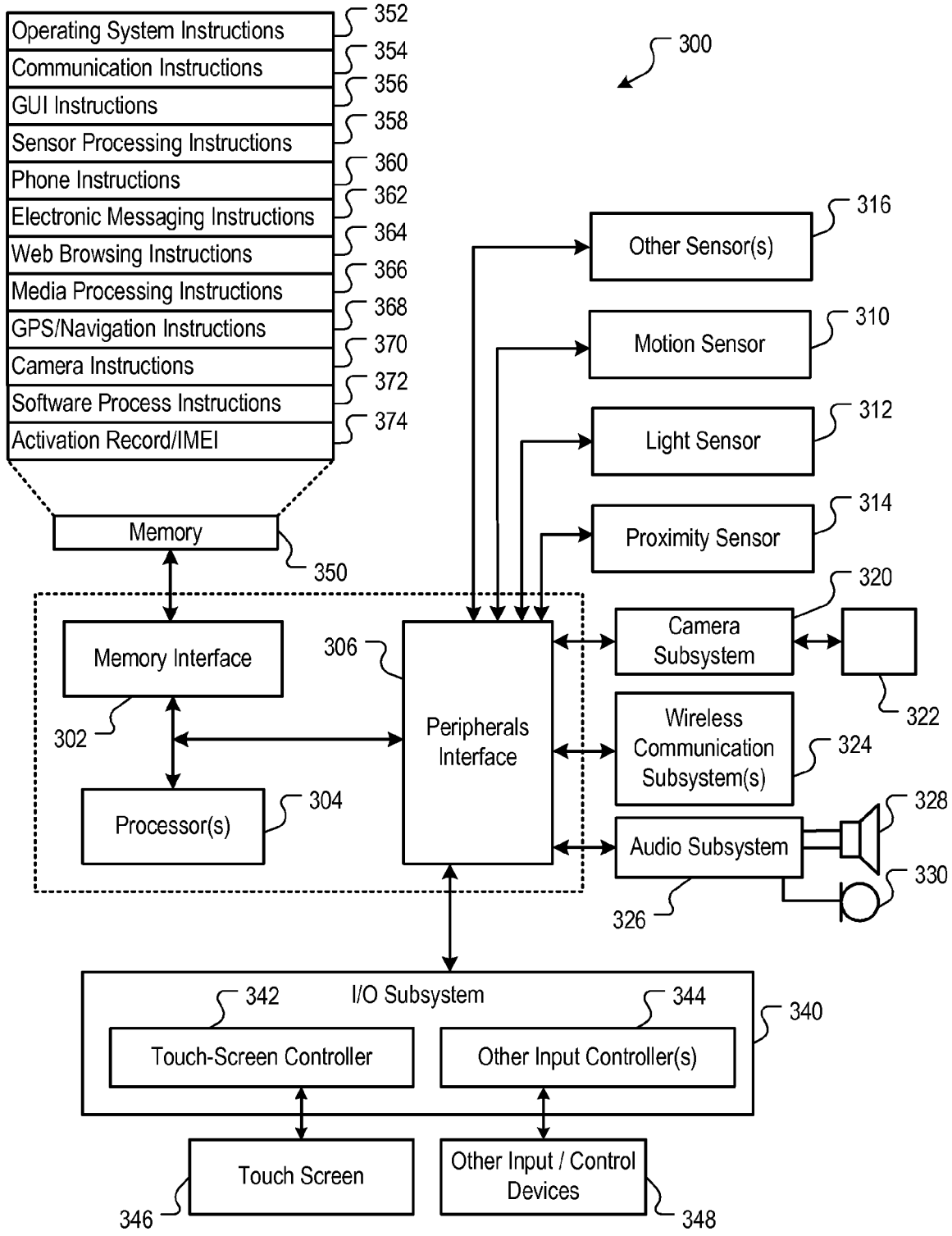
Operating System Instructions
Communication Instructions
GUI Instructions
Sensor Processing Instructions
Phone Instructions
Electronic Messaging Instructions
Web Browsing Instructions
Media Processing Instructions
GPS/Navigation Instructions
Camera Instructions
Software Process Instructions
Activation Record/IMEI
352
354
356
358
360
362
364
366
368
370
372
374
300
Memory
350
Other Sensor(s)
316
Motion Sensor
310
Light Sensor
312
Proximity Sensor
314
Memory Interface
302
306
Peripherals Interface
Camera Subsystem
320
322
Wireless Communication Subsystem(s)
324
Processor(s)
304
Audio Subsystem
328
330
326
I/O Subsystem
342
344
340
Touch-Screen Controller
Other Input Controller(s)
Touch Screen
346
Other Input / Control Devices
348

FIG. 3

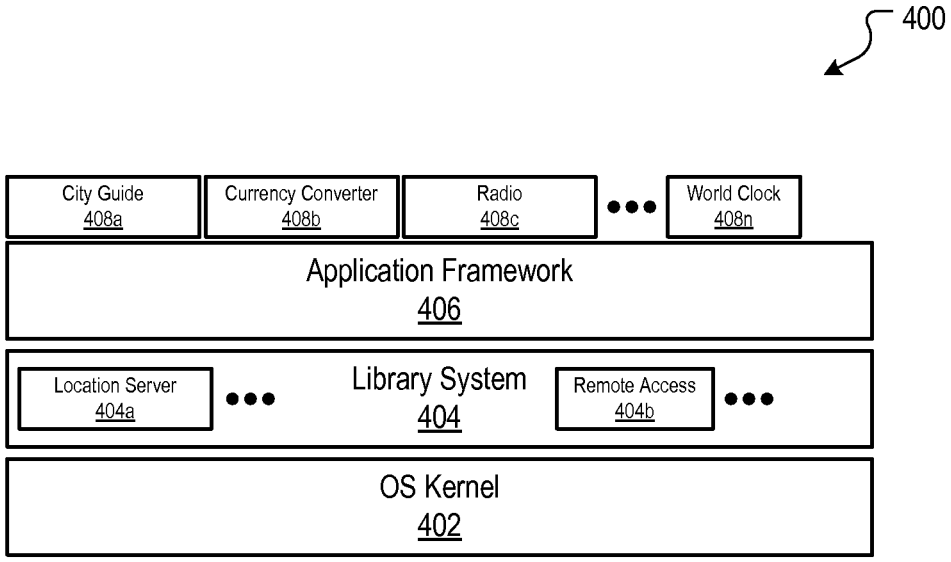
400
City Guide
408a
Currency Converter
408b
Radio
408c
World Clock
408n
Application Framework
406
Location Server
404a
Library System
404
Remote Access
404b
OS Kernel
402

FIG. 4A

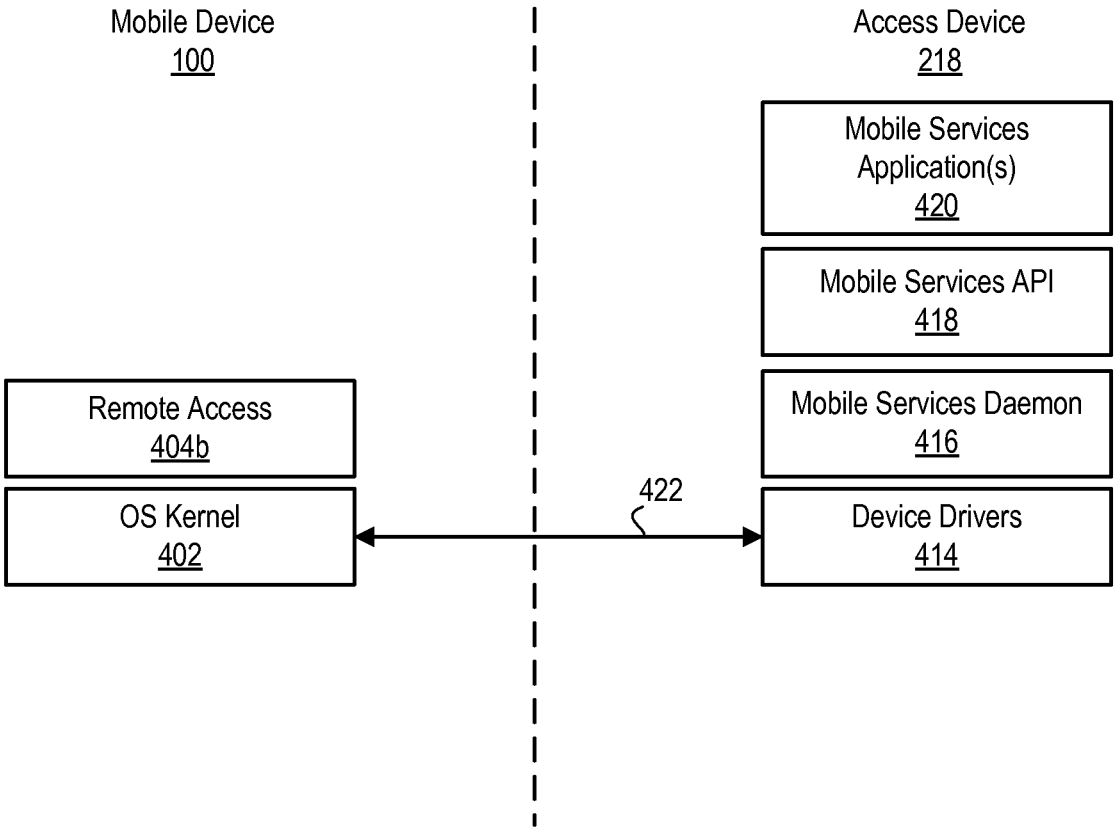
Mobile Device
100
Access Device
218
Mobile Services Application(s)
420
Mobile Services API
418
Mobile Services Daemon
416
Remote Access
404b
OS Kernel
402
422
Device Drivers
414

FIG. 4B

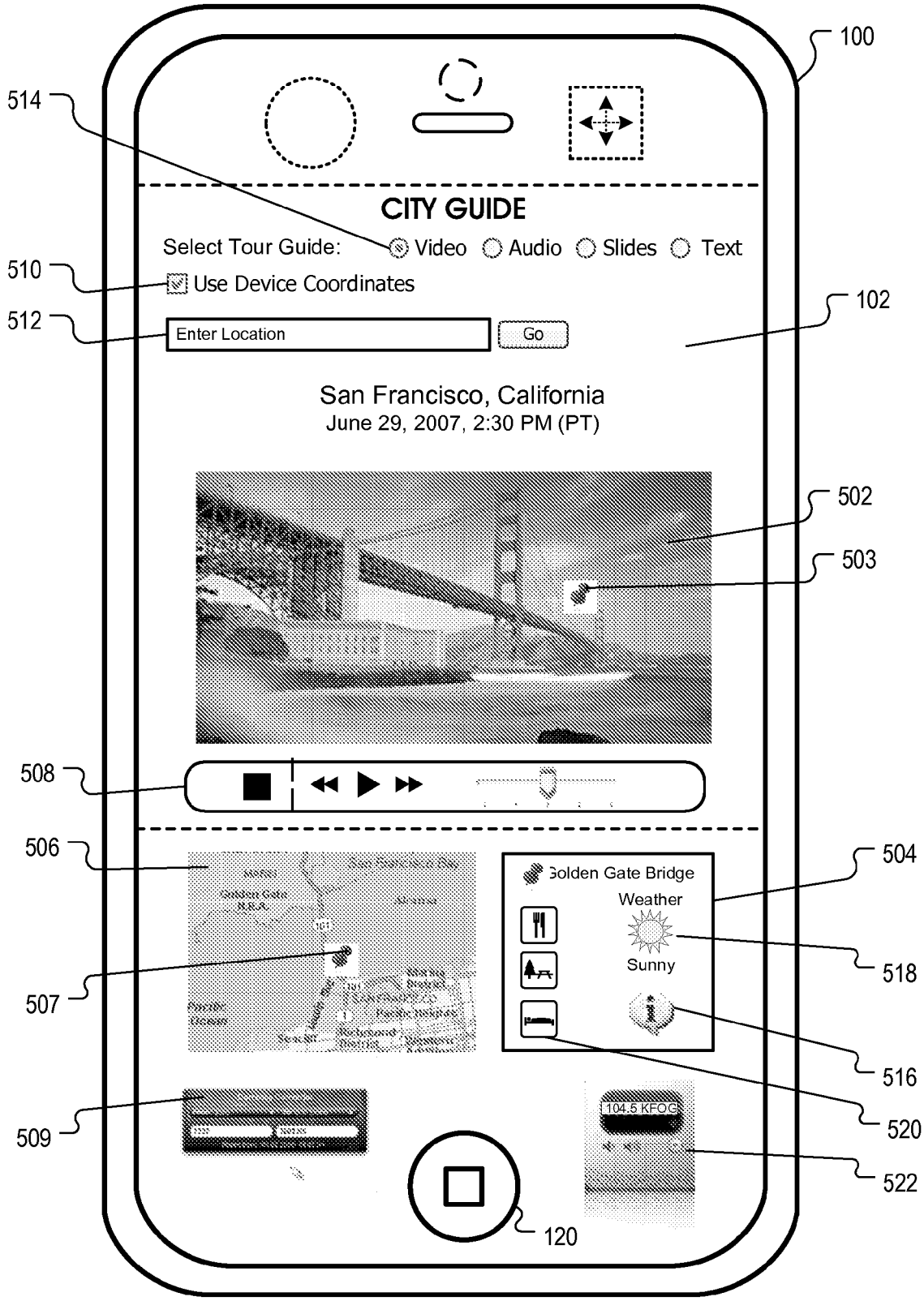
100
514
CITY GUIDE
Select Tour Guide:
Video
Audio
Slides
Text
510
Use Device Coordinates
512
Enter Location
Go
102
San Francisco, California
June 29, 2007, 2:30 PM (PT)
502
503
508
506
504
Golden Gate Bridge
Weather
Sunny
518
507
516
520
509
104.5 KFOG
522
120

FIG. 5

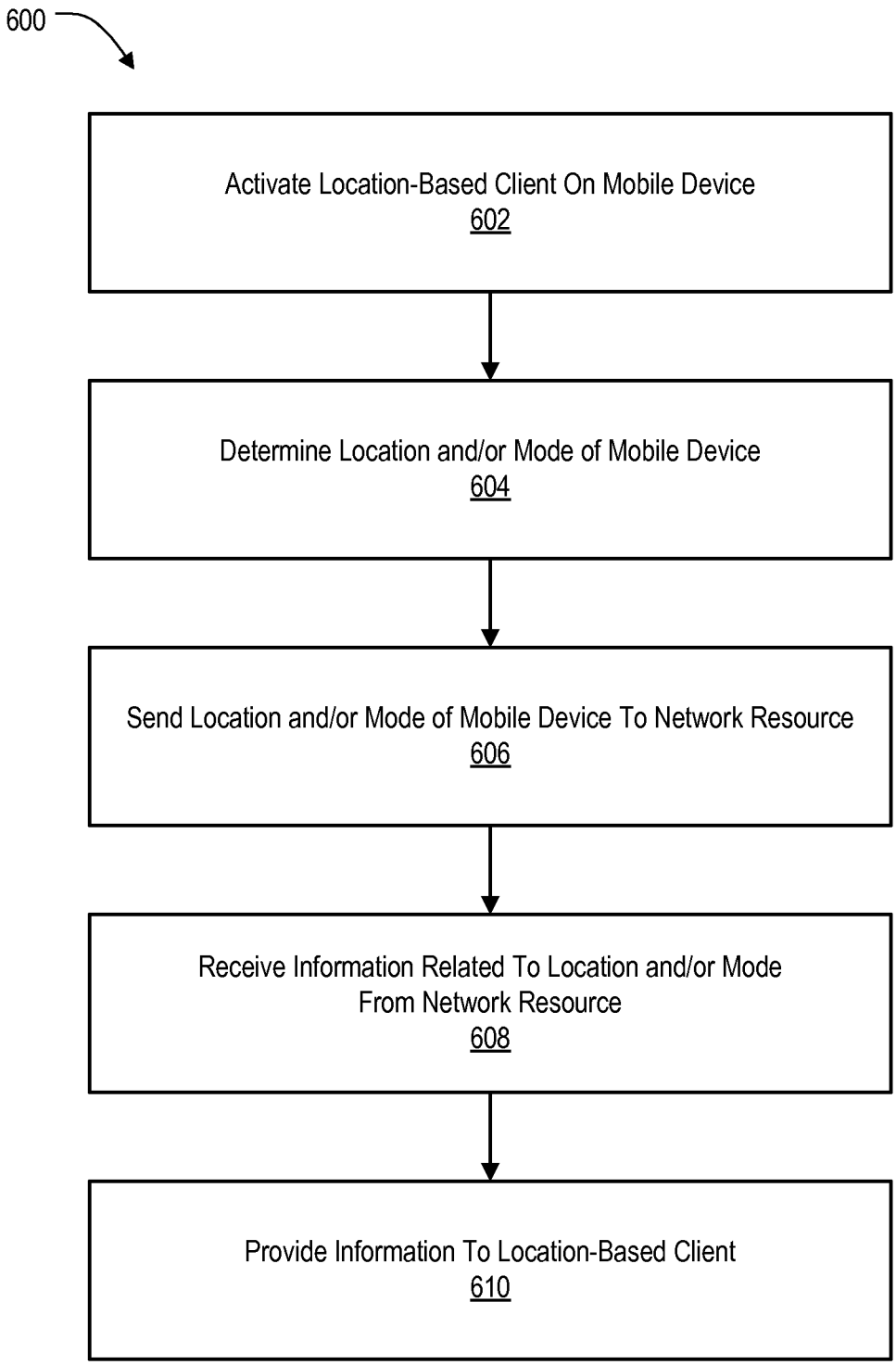
600
Activate Location-Based Client On Mobile Device
602
Determine Location and/or Mode of Mobile Device
604
Send Location and/or Mode of Mobile Device To Network Resource
606
Receive Information Related To Location and/or Mode From Network Resource
608
Provide Information To Location-Based Client
610

FIG. 6

LOCATION-AWARE MOBILE DEVICE

RELATED APPLICATION

This application claims the benefit of priority from U.S. Patent Application No. 60/946,774, filed Jun. 28, 2007, which provisional patent application is incorporated by reference herein in its entirety.

TECHNICAL FIELD

The subject matter of this patent application is generally related to mobile devices.

BACKGROUND

Conventional mobile devices are often dedicated to performing a specific application. For example, a mobile phone provides telephony services, a personal digital assistant (PDA) provides a way to organize addresses, contacts and notes, a media player plays content, email devices provide email communication, etc. Modern mobile devices can include two or more of these applications. Due to the size limitation of a typical mobile device, such mobile devices may need to rely on a network or other remote services to support these multiple applications. For example, a map service may provide maps to a mobile device over a network, which can be used with one or more applications running on the mobile device. The introduction of a positioning system integrated with, or coupled to, the mobile device provides additional opportunities for providing location-based services.

SUMMARY

One or more location-based clients can be activated on a mobile device for providing location-based services. The location-based clients can be provided with information (e.g., presets, defaults) related to the current location and/or mode of the mobile device. The information can be obtained from one or more network resources. In some implementations, a number of location-based clients can run concurrently on the mobile device and share information.

In some implementations, a method includes: activating a first location-based client on a mobile device; determining a location of the mobile device; determining a mode associated with the device; transmitting the location and mode to a network resource; receiving information related to the location and mode from the network resource; and providing the information to the first location-based client.

In some implementations, a method includes: receiving a location of a mobile device; receiving a mode associated with the mobile device; identifying information related to the location and the mode; and transmitting the information to the mobile device.

Other implementations are disclosed which are directed to systems, methods and computer-readable mediums.

DESCRIPTION OF DRAWINGS

FIG. **1** is a block diagram of an example mobile device.

FIG. **2** is a block diagram of an example network operating environment for the mobile device of FIG. **1**.

FIG. **3** is a block diagram of an example implementation of the mobile device of FIG. **1**.

FIG. **4**A illustrates an example implementation of a software stack for the mobile device of FIG. **1**

FIG. **4**B illustrates an example implementation of a security process for remote access management over a secure communications channel.

FIG. **5** is a block diagram of an example of a mobile device running location-based clients.

FIG. **6** is a flow diagram of a process for providing location-based information to location-based clients.

DETAILED DESCRIPTION

FIG. **1** is a block diagram of an example mobile device **100**. The mobile device **100** can be, for example, a handheld computer, a personal digital assistant, a cellular telephone, a network appliance, a camera, a smart phone, an enhanced general packet radio service (EGPRS) mobile phone, a network base station, a media player, a navigation device, an email device, a game console, or other electronic device or a combination of any two or more of these devices.

Mobile Device Overview

In some implementations, the mobile device **100** includes a touch-sensitive display **102**. The touch-sensitive display **102** can implement liquid crystal display (LCD) technology, light emitting polymer display (LPD) technology, or some other display technology. The touch-sensitive display **102** can be sensitive to haptic and/or tactile contact with a user.

In some implementations, the touch-sensitive display **102** can comprise a multi-touch-sensitive display **102**. A multi-touch-sensitive display **102** can, for example, process multiple simultaneous touch points, including processing data related to the pressure, degree and/or position of each touch point. Such processing facilitates gestures and interactions with multiple fingers, chording, and other interactions. Other touch-sensitive display technologies can also be used, e.g., a display in which contact is made using a stylus or other pointing device. Some examples of multi-touch-sensitive display technology are described in U.S. Pat. Nos. 6,323,846, 6,570,557, 6,677,932, and U.S. Patent Publication 2002/0015024A1, each of which is incorporated by reference herein in its entirety.

In some implementations, the mobile device **100** can display one or more graphical user interfaces on the touch-sensitive display **102** for providing the user access to various system objects and for conveying information to the user. In some implementations, the graphical user interface can include one or more display objects **104**, **106**. In the example shown, the display objects **104**, **106**, are graphic representations of system objects. Some examples of system objects include device functions, applications, windows, files, alerts, events, or other identifiable system objects.

Example Mobile Device Functionality

In some implementations, the mobile device **100** can implement multiple device functionalities, such as a telephony device, as indicated by a phone object **110**; an e-mail device, as indicated by the e-mail object **112**; a network data communication device, as indicated by the Web object **114**; a Wi-Fi base station device (not shown); and a media processing device, as indicated by the media player object **116**. In some implementations, particular display objects **104**, e.g., the phone object **110**, the e-mail object **112**, the Web object **114**, and the media player object **116**, can be displayed in a menu bar **118**. In some implementations, device functionalities can be accessed from a top-level graphical user interface, such as the graphical user interface illustrated in FIG. **1**.

Touching one of the objects **110**, **112**, **114** or **116** can, for example, invoke corresponding functionality.

In some implementations, the mobile device **100** can implement network distribution functionality. For example, the functionality can enable the user to take the mobile device **100** and its associated network while traveling. In particular, the mobile device **100** can extend Internet access (e.g., Wi-Fi) to other wireless devices in the vicinity. For example, mobile device **100** can be configured as a base station for one or more devices. As such, mobile device **100** can grant or deny network access to other wireless devices.

In some implementations, upon invocation of device functionality, the graphical user interface of the mobile device **100** changes, or is augmented or replaced with another user interface or user interface elements, to facilitate user access to particular functions associated with the corresponding device functionality. For example, in response to a user touching the phone object **110**, the graphical user interface of the touch-sensitive display **102** may present display objects related to various phone functions; likewise, touching of the email object **112** may cause the graphical user interface to present display objects related to various e-mail functions; touching the Web object **114** may cause the graphical user interface to present display objects related to various Web-surfing functions; and touching the media player object **116** may cause the graphical user interface to present display objects related to various media processing functions.

In some implementations, the top-level graphical user interface environment or state of FIG. **1** can be restored by pressing a button **120** located near the bottom of the mobile device **100**. In some implementations, each corresponding device functionality may have corresponding "home" display objects displayed on the touch-sensitive display **102**, and the graphical user interface environment of FIG. **1** can be restored by pressing the "home" display object.

In some implementations, the top-level graphical user interface can include additional display objects **106**, such as a short messaging service (SMS) object **130**, a calendar object **132**, a photos object **134**, a camera object **136**, a calculator object **138**, a stocks object **140**, a weather object **142**, a maps object **144**, a city guide object **146**, a clock object **148**, an address book object **150**, and a settings object **152**. Touching the SMS display object **130** can, for example, invoke an SMS messaging environment and supporting functionality; likewise, each selection of a display object **134**, **136**, **138**, **140**, **142**, **144**, **146**, **148**, **150** and **152** can invoke a corresponding object environment and functionality.

Additional and/or different display objects can also be displayed in the graphical user interface of FIG. **1**. For example, if the device **100** is functioning as a base station for other devices, one or more "connection" objects may appear in the graphical user interface to indicate the connection. In some implementations, the display objects **106** can be configured by a user, e.g., a user may specify which display objects **106** are displayed, and/or may download additional applications or other software that provides other functionalities and corresponding display objects.

In some implementations, the mobile device **100** can include one or more input/output (I/O) devices and/or sensor devices. For example, a speaker **160** and a microphone **162** can be included to facilitate voice-enabled functionalities, such as phone and voice mail functions. In some implementations, a loud speaker **164** can be included to facilitate hands-free voice functionalities, such as speaker phone functions. An audio jack **166** can also be included for use of headphones and/or a microphone.

In some implementations, a proximity sensor **168** can be included to facilitate the detection of the user positioning the mobile device **100** proximate to the user's ear and, in response, to disengage the touch-sensitive display **102** to prevent accidental function invocations. In some implementations, the touch-sensitive display **102** can be turned off to conserve additional power when the mobile device **100** is proximate to the user's ear.

Other sensors can also be used. For example, in some implementations, an ambient light sensor **170** can be utilized to facilitate adjusting the brightness of the touch-sensitive display **102**. In some implementations, an accelerometer **172** can be utilized to detect movement of the mobile device **100**, as indicated by the directional arrow **174**. Accordingly, display objects and/or media can be presented according to a detected orientation, e.g., portrait or landscape. In some implementations, the mobile device **100** may include circuitry and sensors for supporting a location determining capability, such as that provided by the global positioning system (GPS) or other positioning systems (e.g., systems using Wi-Fi access points, television signals, cellular grids, Uniform Resource Locators (URLs)). In some implementations, a positioning system (e.g., a GPS receiver) can be integrated into the mobile device **100** or provided as a separate device that can be coupled to the mobile device **100** through an interface (e.g., port device **190**) to provide access to location-based services.

The mobile device **100** can also include a camera lens and sensor **180**. In some implementations, the camera lens and sensor **180** can be located on the back surface of the mobile device **100**. The camera can capture still images and/or video.

The mobile device **100** can also include one or more wireless communication subsystems, such as a 802.11b/g communication device **186**, and/or a Bluetooth™ communication device **188**. Other communication protocols can also be supported, including other 802.x communication protocols (e.g., WiMax, Wi-Fi, 3G), code division multiple access (CDMA), global system for mobile communications (GSM), Enhanced Data GSM Environment (EDGE), etc.

In some implementations, a port device **190**, e.g., a Universal Serial Bus (USB) port, or a docking port, or some other wired port connection, can be included. The port device **190** can, for example, be utilized to establish a wired connection to other computing devices, such as other communication devices **100**, network access devices, a personal computer, a printer, or other processing devices capable of receiving and/or transmitting data. In some implementations, the port device **190** allows the mobile device **100** to synchronize with a host device using one or more protocols, such as, for example, the TCP/IP, HTTP, UDP and any other known protocol.

Network Operating Environment

FIG. **2** is a block diagram of an example network operating environment **200** for the mobile device **100** of FIG. **1**. The mobile device **100** of FIG. **1** can, for example, communicate over one or more wired and/or wireless networks **210** in data communication. For example, a wireless network **212**, e.g., a cellular network, can communicate with a wide area network (WAN) **214**, such as the Internet, by use of a gateway **216**. Likewise, an access point **218**, such as an 802.11g wireless access point, can provide communication access to the wide area network **214**. In some implementations, both voice and data communications can be established over the wireless network **212** and the access point **218**. For example, the mobile device **100***a* can place and receive phone calls (e.g.,

using VoIP protocols), send and receive e-mail messages (e.g., using POP3 protocol), and retrieve electronic documents and/or streams, such as web pages, photographs, and videos, over the wireless network **212**, gateway **216**, and wide area network **214** (e.g., using TCP/IP or UDP protocols). Likewise, the mobile device **100***b* can place and receive phone calls, send and receive e-mail messages, and retrieve electronic documents over the access point **218** and the wide area network **214**. In some implementations, the mobile device **100** can be physically connected to the access point **218** using one or more cables and the access point **218** can be a personal computer. In this configuration, the mobile device **100** can be referred to as a "tethered" device.

The mobile devices **100***a* and **100***b* can also establish communications by other means. For example, the wireless device **100***a* can communicate with other wireless devices, e.g., other wireless devices **100**, cell phones, etc., over the wireless network **212**. Likewise, the mobile devices **100***a* and **100***b* can establish peer-to-peer communications **220**, e.g., a personal area network, by use of one or more communication subsystems, such as the Bluetooth™ communication device **188** shown in FIG. **1**. Other communication protocols and topologies can also be implemented.

The mobile device **100** can, for example, communicate with one or more services **230**, **240**, **250**, **260**, **270** over the one or more wired and/or wireless networks **210**. For example, a navigation service **230** can provide navigation information, e.g., map information, location information, route information, and other information, to the mobile device **100**. In the example shown, a user of the mobile device **100***b* has invoked a map functionality, e.g., by pressing the maps object **144** on the top-level graphical user interface shown in FIG. **1**, and has requested and received a map for the location "1 Infinite Loop, Cupertino, Calif."

A messaging service **240** can, for example, provide e-mail and/or other messaging services. A media service **250** can, for example, provide access to media files, such as song files, movie files, video clips, and other media data. A syncing service **260** can, for example, perform syncing services (e.g., sync files). An activation service **270** can, for example, perform an activation process **500** for activating the mobile device **100**, as described in reference to FIG. **5**. Other services can also be provided, including a software update service that automatically determines whether software updates exist for software on the mobile device **100**, then downloads the software updates to the mobile device **100** where it can be manually or automatically unpacked and/or installed.

The mobile device **100** can also access other data and content over the one or more wired and/or wireless networks **210**. For example, content publishers **270**, such as news sites, RSS feeds, web sites, blogs, social networking sites, developer networks, etc., can be accessed by the mobile device **100**. Such access can be provided by invocation of a web browsing function or application (e.g., a browser) in response to a user touching the Web object **114**.

Example Mobile Device Architecture

FIG. **3** is a block diagram **300** of an example implementation of the mobile device **100** of FIG. **1**. The mobile device **100** can include a memory interface **302**, one or more data processors, image processors and/or central processing units **304**, and a peripherals interface **306**. The memory interface **302**, the one or more processors **304** and/or the peripherals interface **306** can be separate components or can be integrated in one or more integrated circuits. The various components in the mobile device **100** can be coupled by one or more communication buses or signal lines.

Sensors, devices and subsystems can be coupled to the peripherals interface **306** to facilitate multiple functionalities. For example, a motion sensor **310**, a light sensor **312**, and a proximity sensor **314** can be coupled to the peripherals interface **306** to facilitate the orientation, lighting and proximity functions described with respect to FIG. **1**. Other sensors **316** can also be connected to the peripherals interface **306**, such as a positioning system (e.g., GPS receiver), a temperature sensor, a biometric sensor, or other sensing device, to facilitate related functionalities.

A camera subsystem **320** and an optical sensor **322**, e.g., a charged coupled device (CCD) or a complementary metal-oxide semiconductor (CMOS) optical sensor, can be utilized to facilitate camera functions, such as recording photographs and video clips.

Communication functions can be facilitated through one or more wireless communication subsystems **324**, which can include radio frequency receivers and transmitters and/or optical (e.g., infrared) receivers and transmitters. The specific design and implementation of the communication subsystem **324** can depend on the communication network(s) over which the mobile device **100** is intended to operate. For example, a mobile device **100** may include communication subsystems **324** designed to operate over a GSM network, a GPRS network, an EDGE network, a Wi-Fi or WiMax network, and a Bluetooth™ network. In particular, the wireless communication subsystems **324** may include hosting protocols such that the device **100** may be configured as a base station for other wireless devices.

An audio subsystem **326** can be coupled to a speaker **328** and a microphone **330** to facilitate voice-enabled functions, such as voice recognition, voice replication, digital recording, and telephony functions.

The I/O subsystem **340** can include a touch screen controller **342** and/or other input controller(s) **344**. The touch-screen controller **342** can be coupled to a touch screen **346**. The touch screen **346** and touch screen controller **342** can, for example, detect contact and movement or break thereof using any of a plurality of touch sensitivity technologies, including but not limited to capacitive, resistive, infrared, and surface acoustic wave technologies, as well as other proximity sensor arrays or other elements for determining one or more points of contact with the touch screen **346**.

The other input controller(s) **344** can be coupled to other input/control devices **348**, such as one or more buttons, rocker switches, thumb-wheel, infrared port, USB port, and/or a pointer device such as a stylus. The one or more buttons (not shown) can include an up/down button for volume control of the speaker **328** and/or the microphone **330**.

In one implementation, a pressing of the button for a first duration may disengage a lock of the touch screen **346**; and a pressing of the button for a second duration that is longer than the first duration may turn power to the mobile device **100** on or off. The user may be able to customize a functionality of one or more of the buttons. The touch screen **346** can, for example, also be used to implement virtual or soft buttons and/or a keypad or keyboard.

In some implementations, the mobile device **100** can present recorded audio and/or video files, such as MP3, AAC, and MPEG files. In some implementations, the mobile device **100** can include the functionality of an MP3 player, such as an iPod™. The mobile device **100** may, therefore, include a 36-pin connector that is compatible with the iPod. Other input/output and control devices can also be used.

The memory interface **302** can be coupled to memory **350**. The memory **350** can include high-speed random access memory and/or non-volatile memory, such as one or more magnetic disk storage devices, one or more optical storage devices, and/or flash memory (e.g., NAND, NOR). The memory **350** can store an operating system **352**, such as Darwin, RTXC, LINUX, UNIX, OS X, WINDOWS, or an embedded operating system such as VxWorks. The operating system **352** may include instructions for handling basic system services and for performing hardware dependent tasks. In some implementations, the operating system **352** can be a kernel (e.g., UNIX kernel), as described in reference to FIGS. **4**A and **4**B.

The memory **350** may also store communication instructions **354** to facilitate communicating with one or more additional devices, one or more computers and/or one or more servers. The memory **350** may include graphical user interface instructions **356** to facilitate graphic user interface processing; sensor processing instructions **358** to facilitate sensor-related processing and functions; phone instructions **360** to facilitate phone-related processes and functions; electronic messaging instructions **362** to facilitate electronic-messaging related processes and functions; web browsing instructions **364** to facilitate web browsing-related processes and functions; media processing instructions **366** to facilitate media processing-related processes and functions; GPS/Navigation instructions **368** to facilitate GPS and navigation-related processes and instructions; camera instructions **370** to facilitate camera-related processes and functions; and/or other software instructions **372** to facilitate processes and functions, as described in reference to FIGS. **4-6**. As described below, an activation record and IMEI or similar hardware identifier **374** can also be stored in memory **350**.

Each of the above identified instructions and applications can correspond to a set of instructions for performing one or more functions described above. These instructions need not be implemented as separate software programs, procedures or modules. The memory **350** can include additional instructions or fewer instructions. Furthermore, various functions of the mobile device **100** may be implemented in hardware and/or in software, including in one or more signal processing and/or application specific integrated circuits.

Software Stack and Security Process

FIG. **4**A illustrates an example implementation of a software stack **400** for the mobile device of FIG. **1**. In some implementations, the software stack **400** includes an operating system (OS) kernel **402** (e.g., a UNIX kernel), a library system **404**, an application framework **406** and an application layer **408**.

The OS kernel **402** manages the resources of the mobile device **100** and allows other programs to run and use these resources. Some examples of resources include a processor, memory and I/O. For example, the kernel **402** can determine which running processes should be allocated to a processor, processors or processor cores, allocates memory to the processes and allocates requests from applications and remote services to perform I/O operations. In some implementations, the kernel **402** provides methods for synchronization and inter-process communications with other devices.

In some implementations, the kernel **402** can be stored in non-volatile memory of the mobile device **100**. When the mobile device **100** is turned on, a boot loader starts executing the kernel **102** in supervisor mode. The kernel then initializes itself and starts one or more processes for the mobile device **100**, including a remote access process **404**b for remote access management, as described in reference to FIG. **4**B.

The library system **404** provides various services applications running in the application layer **408**. Such services can include audio services, video services, database services, image processing services, graphics services, location-based services, etc.

The application framework **406** provides an object-oriented application environment including classes and Application Programming Interfaces (APIs) that can be used by developers to build applications using well-known programming languages (e.g., Objective-C, Java).

The applications layer **408** is where various applications exist in the software stack **400**. Developers can use the APIs and environment provided by the application framework **406** to build applications, such as the applications represented by the display objects **104**, **106**, shown in FIG. **1** (e.g., email, media player, Web browser, phone).

In some implementations, the applications layer **408** includes one or more location-based clients (e.g., applications, widgets). In the example shown, the applications layer **408** includes a City Guide client **408***a*, a currency converter client **408***b*, a radio client **408***c* and a world clock client **408***n*. Other location-based clients are possible, such as an information directory client (e.g., "Yellow Pages"), a music client, a weather client, a sports client, a movie/television client, a tidal watch client, a golf helper client, etc. Each of these location-based clients will be described in more detail in reference to FIGS. **5** and **6**.

In some implementations, the location-based clients **408***a-n* can make calls to various services provided by the library system **404**. The services can be accessed by the clients **408***a-n* through the application framework **406**, for example. In the example shown, the library system **404** includes a location server **404***a* and a remote access process **404***b*. The location server **404***a* is a server process that communicates with a positioning system (e.g., a GPS receiver integrated or coupled to the mobile device **100**) and serves the current position coordinates of the mobile device to the location-based clients **408***a-n* in response to a client request or other trigger event. In some implementations, the position coordinates are stored in a location in memory **350** (e.g., a reserved memory location), which can be accessed by clients **408***a-n*. The location server **404***a* can refresh the location in memory **350** on a periodic basis or in response to a trigger event.

Secure Communication Channel

FIG. **4**B illustrates an example implementation of the remote access process **404***b* for remote access management over a communications channel **422** (e.g., a secure communications channel). In the example shown, the mobile device **100** is running the remote access process **404***b*, which communicates with the OS kernel **402**. Any remote access requests made to the kernel **402** are intercepted by the process **404***b*, which is responsible for setting up communication sessions between the mobile device **100** and mobile services access device. In some implementations, the process **404***b* uses a cryptographic protocol, such as Secure Sockets Layer (SSL) or Transport Layer Security (TLS) to provide secure communication sessions between the mobile device **100** and an access point **218**. The access point **218** can be any device with network connectivity, including but not limited to: a personal computer, a hub, an Ethernet card, another mobile device, a wireless base station, etc. The secure communications channel can be a Universal Serial Bus (USB), Ethernet,

a wireless link (e.g., Wi-Fi, WiMax, 3G), an optical link, infrared link, FireWire™, or any other known communications channel or media.

In the example shown, the access point **218** includes device drivers **414**, a mobile services daemon **416**, a mobile services API **418** and one or more mobile service applications **420**. The device drivers **414** are responsible for implementing a transport layer protocol, such as TCP/IP over USB. The mobile services daemon **416** listens (e.g. continuously) to the communications channel **422** for activity and manages the transmission of commands and data over the communication channel **422**. The mobile services API **418** provides a set of functions, procedures, variables and data structures for supporting requests for services made by the mobile services application **420**. The mobile services application **420** can be a client program running on the access point, which provides one or more user interfaces for allowing a user to interact with a remote service (e.g., activation service **270**) over a network (e.g., the Internet, wireless network, peer-to-peer network, optical network, Ethernet, intranet). The application **420** can allow a user to set preferences, download or update files of content or software, search databases, store user data, select services, browse content, perform financial transactions, or engage in any other online service or function. An example of a mobile services application **420** is the iTunes™ client, which is publicly available from Apple, Inc. (Cupertino, Calif.). An example of mobile device **100** that uses the iTunes™ client is the iPod™ product developed by Apple Inc.

In an example operational mode, a user connects the mobile device **100** to the mobile access point using, for example, a USB cable. In other implementations, the mobile device **100** and access point **218** include wireless transceivers for establishing a wireless link (e.g., Wi-Fi). The drivers **414** and kernel **408** detect the connection and alert the remote access process **404***b* and mobile services daemon **416** of the connection status. Once the connection is established certain non-sensitive information can be passed from the mobile device **100** to the access point **218** (e.g., name, disk size, activation state) to assist in establishing a secure communication session.

In some implementations, the remote access process **404***b* establishes a secure communication session (e.g., encrypted SSL session) with the access point **218** by implementing a secure network protocol. For example, if using SSL protocol, the mobile device **100** and access point **218** will negotiate a cipher suite to be used during data transfer, establish and share a session key, and authenticate the access point **218** to the mobile device **100**. In some implementations, if the mobile device **100** is password protected, the process **404***b* will not establish a session, and optionally alert the user of the reason for failure.

Once a secure session is successfully established, the mobile device **100** and the access point **218** can exchange sensitive information (e.g., passwords, personal information), and remote access to the mobile device **100** can be granted to one or more services (e.g., navigation service **230**, messaging service **240**, media service **250**, syncing service **260**, activation service **270**). In some implementations, the mobile services daemon **416** multiplexes commands and data for transmission over the communication channel **422**. This multiplexing allows several remote services to have access to the mobile device **100** in a single session without the need to start a new session (or handshaking) for each service requesting access to the mobile device **100**.

Location-Based Clients

FIG. **5** is a block diagram of an example of a mobile device **100** running location-based clients. In the example shown, the mobile device **100** is running a City Guide client, and the mobile device **100** is located in San Francisco. The City Guide client presents various information related to San Francisco on the touch-sensitive display **102**. In this example, the user selected a "Use Device Coordinates" option **510**. Selecting this option engages a positioning system (e.g., a GPS receiver) that automatically determines the geographic location of the mobile device **100**. In other implementations, the user can enter a location of interest in a search box **512**.

In some implementations, the City Guide client allows a user to select one of four city guide modes: video mode **514**, audio mode, slide mode and text mode. In this example, the user selected the video mode **514**. The video mode **514** provides a video tour of San Francisco using a video display **502**, which can be controlled by the user with video controls **508**. In some implementations, placemarks (e.g., pushpins) are overlaid on the video at locations for which there is additional information available. The additional information can be presented on the touch-sensitive display **102** in a variety of ways, including as a map **506** or through a directory **504** or other user interface element or control (e.g., a menu system). In the example shown, the location currently shown in the video display **502** is the Golden Gate Bridge, which is marked with pushpin **503**. The location is also marked on the map **506** with a corresponding pushpin **507**. Some examples of locations that could be represented on a map by placemarks include businesses (e.g., restaurants, lodging), services (e.g., hospitals, police) and attractions (e.g., parks, picnic areas, monuments).

The directory **504** can include several user interface elements that can be selected (e.g., touched by a finger or stylus) to provide additional information related to the location marked by the pushpins **503** and **507**, which in this example is the Golden Gate Bridge. In some implementations, the directory **504** can include user interface elements (e.g., buttons) that can be selected to display information about restaurants, lodging, parks, picnic areas, and/or businesses in the vicinity of the Golden Gate Bridge. The current weather **504** can also be shown, or any other information **516** relevant to the current location of the mobile device **100**. In some implementations, advertisements for products or services related to the location and/or a mode (e.g., video mode) of the mobile device **100** can be presented on the mobile device **100** using display means (e.g., the touch-sensitive display **102**) and/or audio means (e.g., a ring tone, text-to-speech, voicemail, an audio file).

Other city guide modes can also be selected by the user. For example, an audio mode can be selected to provide an audio tour of San Francisco, a slide mode can be selected to provide a slide show of San Francisco and a text mode can be selected to provide an electronic guide book of San Francisco. In some implementations, one or more modes can be combined to provide a multimedia presentation.

An advantage of the implementation just described is the ability of location-based clients to share information. In the example shown, the device coordinates were provided by the location server **404***a*. In some implementations, when the user selects the video mode **514**, the mobile device **100** establishes a communication session with a remote service (e.g., a server) over a communications channel (e.g., wired or wireless link). The mobile device **100** provides the service with the position coordinates of the mobile device **100** and the service returns video, map and directory information to the mobile device **100**, where it can be used by one or more location-based clients. In some implementations, the service provides presets or default values for loading into one or more location-based clients. As the user navigates the video guide with the controls **508**, information regarding the current loca-

tion is shared with a map service for rendering the map **506**, and for determining which information to list in the directory **504**.

Other location-based clients include a currency converter **509** which can be loaded with a preset for converting currency based on the location of the mobile device **100**. In this example, the currency converter **509** allows the user to convert from a desired foreign currency to U.S. currency, or vice-versa. Another client can be a radio client **522** for streaming music by local artists and providing local concert information. The radio client could be loaded with presets for local radio stations. A "Yellow Pages" client could be loaded with local listings. A weather client could be loaded with local weather conditions, a world clock client could be loaded with the local time, a tidal watch client could be loaded with local tide tables (e.g., for use by surfers and fisherman), a golf helper client could be loaded with information about local golf courses (e.g., notes about the course conditions, pars, and strategies for playing the holes). All or some of these clients can operate on the mobile device **100** either alone or concurrently with other clients and share information. In some implementations, information from a first client can be used to change properties or attributes of a second location-based client (e.g., change a user interface associated with a client). In some implementations, activating a first location-based client causes a second location-based client to activate.

In some implementations, the user can interact with the clients and leave information which can be uploaded from the mobile device **100** to the service, where it can be accessed by or shared with other users. For example, the user could touch a pushpin **503**, **507**, and be provided with information regarding the location marked by the pushpin, **503**, **507**. Additionally, a text box or other input mechanism can be presented for allowing the user to enter information or attach content (e.g., digital photos), which can be sent to the service.

FIG. **6** is a flow diagram of a process **600** for providing location-based information (e.g., presets, defaults) to location-based clients. The process **600** begins when a location-based client is activated on the mobile device (**602**). The client can be activated manually by the user through, for example, the touch-sensitive display **102**, or automatically by another client or trigger event.

The location and/or a mode of the mobile device is determined (**604**). The location (e.g., latitude, longitude) can be determined by a positioning system integrated in, or coupled to, the mobile device. The location can be determined independent of whether any client is currently active. The location and/or mode can be transmitted to one or more network resources (**606**). The network resources can use the location and/or mode to identify relevant information to send to the mobile device. In some implementations, the information can be selected based on the type of location-based client requesting the information.

A mode can indicate a state of the device or a context based on user activity. For example, if the user is browsing the web with the mobile device **100**, then the mobile device **100** can provide a context mode descriptor to the service indicating that the user is currently in a browsing mode. The descriptor can also include search terms, a current web page URL, historical browsing patterns (e.g., URLs of cached web pages), bookmarks, etc. The service can use the descriptor to provide location-based services and/or content. In another example, if the user is taking digital pictures with the mobile device **100** (e.g., a camera integrated with a mobile phone), then the mobile device **100** can send a state mode descriptor to the service indicating that the user is currently taking a digital picture. The service can use the descriptor to provide location-based service, such a link to a camera store or a website where the user can upload and share their photos. In another example, an audio mode descriptor can be set to the service for indicating that the user is currently listening to music (e.g., operating an MP3 player). The service can use the audio mode descriptor to provide location-based services and/or content related to music. The audio mode descriptor could also include information about the song being played, such as title, artist, genre, etc.

The information is received by the mobile device (**608**), and provided to the location-based client requesting the information (**610**). In some implementations, the information can be updated periodically or in response to a trigger event while the location-based client is in operation.

In some implementations, each location-based client has a unique identifier that can be sent to the service, so that the service knows the type of client that will be using the information. In the example shown, the mobile device **100** can send one or more identifiers or descriptors to the service that indicate that the user is running a City Guide location-based client and that a video mode **514** has been selected. The service can then use the identifiers and the location information to download a video city guide for San Francisco.

In some implementations, a mobile device connected to a communications network may download a "tour" which is an association of data and locations. For example, a set of video, music, spoken or text content associated with various points on a path such as a road or trail for education, tourism, recreation, etc. In some implementations, a set of speeds or other vehicle related recommendations can also be downloaded. The recommendations can include, for example, suggested gear shifts associated with specific road segments for energy efficient driving and safety.

In some implementations, a mobile device in association with a location aware system (e.g., GPS, accelerometer, inertial measurement unit) can play data or content associated with a path or road as a tour is traveled by a person or vehicle. For example, video, music, spoken or text content may be presented as the user moves through the associated locations on a walk or drive. Alternatively, the vehicle related settings and recommendations (e.g., gear position, speed) may be displayed or presented as the vehicle moves through the various segments of the drive. In this embodiment, real time data from the vehicle (e.g., remaining charge, remaining fuel, etc.) may be used to fine tune or adjust the recommendations for the rest of the path traveled. Vehicle equipment can be used as a display system or presentation system. For example, the vehicle's GPS or other console can be used to display video or text and the vehicle's speaker system can be used to play audio. The mobile device can communicate tour data and content to vehicle equipment through a wired or wireless link (e.g., cable, Bluetooth link).

In some implementations, an accelerometer based system with a processor and a memory can improve location estimates during, for example, a walking or driving tour. Given an accurate start point and a route, the system can determine that a particular path or route is being followed based on detection of turns and direction of turns. As the vehicle or user moves up and down over highway ramps, major dips in the road, bridges, etc., the accelerometer can detect changes in vertical velocity and map a vertical velocity change profile of the vehicle to one of several possible routes. The velocity change profile can be combined with the turn information and/or GPS or other positioning technology (e.g., Wi-Fi, cell tower triangulation) to improve location estimates for the vehicle.

In some implementations, a tour's content may change depending on the direction and speed of the mobile device

100. For example, if a user is heading North, the mobile device 100 may present the user with material for destinations that the user is about to reach. Thus, in addition to receiving content based on current location, the service can determine (e.g., predict) the user's future locations based on sensor data, route traveled, landmarks, etc., and provide location-based services and/or content based on those future locations. In some implementations, the way content is presented to a user can change based on user's travel speed. For example, a speedy traveler could receive heading pages for prior saved media and a strolling traveler could see a complete presentation.

The features described can be implemented in digital electronic circuitry, or in computer hardware, firmware, software, or in combinations of them. The features can be implemented in a computer program product tangibly embodied in an information carrier, e.g., in a machine-readable storage device or in a propagated signal, for execution by a programmable processor; and method steps can be performed by a programmable processor executing a program of instructions to perform functions of the described implementations by operating on input data and generating output.

After the mobile device is activated, in some implementations the remote access process **404***b* monitors remote access requests and sets-up and tears-down secure sessions as needed. Thus, in such an implementation all remote access requests are managed by a single remote access process **404***b*. If a user alters the mobile device (e.g., changing a SIM card), the remote access process **404***b* will detect the change and initiate an action, such as starting a new activation process **500**, **600**.

The described features can be implemented advantageously in one or more computer programs that are executable on a programmable system including at least one programmable processor coupled to receive data and instructions from, and to transmit data and instructions to, a data storage system, at least one input device, and at least one output device. A computer program is a set of instructions that can be used, directly or indirectly, in a computer to perform a certain activity or bring about a certain result. A computer program can be written in any form of programming language (e.g., Objective-C, Java), including compiled or interpreted languages, and it can be deployed in any form, including as a stand-alone program or as a module, component, subroutine, or other unit suitable for use in a computing environment.

Suitable processors for the execution of a program of instructions include, by way of example, both general and special purpose microprocessors, and the sole processor or one of multiple processors or cores, of any kind of computer. Generally, a processor will receive instructions and data from a read-only memory or a random access memory or both. The essential elements of a computer are a processor for executing instructions and one or more memories for storing instructions and data. Generally, a computer will also include, or be operatively coupled to communicate with, one or more mass storage devices for storing data files; such devices include magnetic disks, such as internal hard disks and removable disks; magneto-optical disks; and optical disks. Storage devices suitable for tangibly embodying computer program instructions and data include all forms of non-volatile memory, including by way of example semiconductor memory devices, such as EPROM, EEPROM, and flash memory devices; magnetic disks such as internal hard disks and removable disks; magneto-optical disks; and CD-ROM and DVD-ROM disks. The processor and the memory can be supplemented by, or incorporated in, ASICs (application-specific integrated circuits).

To provide for interaction with a user, the features can be implemented on a computer having a display device such as a CRT (cathode ray tube) or LCD (liquid crystal display) monitor for displaying information to the user and a keyboard and a pointing device such as a mouse or a trackball by which the user can provide input to the computer.

The features can be implemented in a computer system that includes a back-end component, such as a data server, or that includes a middleware component, such as an application server or an Internet server, or that includes a front-end component, such as a client computer having a graphical user interface or an Internet browser, or any combination of them. The components of the system can be connected by any form or medium of digital data communication such as a communication network. Examples of communication networks include, e.g., a LAN, a WAN, and the computers and networks forming the Internet.

The computer system can include clients and servers. A client and server are generally remote from each other and typically interact through a network. The relationship of client and server arises by virtue of computer programs running on the respective computers and having a client-server relationship to each other.

A number of implementations have been described. Nevertheless, it will be understood that various modifications may be made. For example, elements of one or more implementations may be combined, deleted, modified, or supplemented to form further implementations. As yet another example, the logic flows depicted in the figures do not require the particular order shown, or sequential order, to achieve desirable results. In addition, other steps may be provided, or steps may be eliminated, from the described flows, and other components may be added to, or removed from, the described systems. Accordingly, other implementations are within the scope of the following claims.

What is claimed is:

1. A method comprising:

activating a first location-based client and a second location-based client for execution on a mobile device;

determining a location of the mobile device;

controlling the first and second location-based clients to concurrently display a first user interface of the first location-based client and a second user interface of the second location based client respectively;

controlling the first location-based client to display, on the first user interface of the first location-based client, visual indications associated with the determined location of the mobile device;

receiving, through the first user interface of the first location-based client, first user input selecting a first visual indication;

in response to receiving the first user input, transmitting, via a network connection, information corresponding to the selected first visual indication to a network resource;

receiving, from the network resource, information that is based on the selected first visual indication, wherein the information includes content corresponding to the first and second location-based clients; and

in response to receiving the information from the network resource:

controlling the first location-based client to update the first user interface of the first location-based client to display first content corresponding to the first location-based client that is included in the received information,

forwarding, to the second location-based client, second content corresponding to the second location-based client that is included in the received information, and

controlling the second location-based client to update the second user interface of the second location-based client to display second content corresponding to the second location-based client that is included in the received information,

wherein the first content is displayed in the first user interface concurrently with displaying the second content in the second user interface, and wherein the format of the first content is different from the format of the second content.

2. The method of claim **1**, where the first location-based client or the second location-based client includes one of: a city or travel guide client, a currency converter client, a radio client, a world clock client, a golf helper client, a directory client, a tidal watch client, a weather client, a movie/television client or a map client.

3. The method of claim **1**, wherein the second user interface associated with the second location-based client is changed using the information received at the first location-based client.

4. The method of claim **1**, wherein the second location-based client on the mobile device is a radio client, and wherein the information received at the first location-based client on the mobile device is used to preset local radio stations in the radio client on the mobile device.

5. The method of claim **1**, wherein the second location-based client is a phonebook client, and wherein the information received at the first location-based client is used to provide local listings in the phonebook client.

6. The method of claim **1**, wherein the second location-based client is a weather client, and wherein the information received at the first location-based client is used to provide local weather conditions in the weather client.

7. The method of claim **1**, wherein controlling the first location-based client to display visual indications associated with the determined location of the mobile device comprises controlling the first location-based client to display a map on the first user interface of the first location-based client, the map including a placemark indicating the determined location of the mobile device, the method further comprising:

receiving a second user input selecting the placemark;

in response to receiving the second user input selecting the placemark, presenting, on the first user interface, an input field for entering new information corresponding to the first visual indication;

receiving, through the first user interface, a third user input entering new information corresponding to the first visual indication; and

transmitting, via a network connection, the entered new information corresponding to the selected first visual indication to the network resource.

8. The method of claim **1**, wherein controlling the first location-based client to display visual indications associated with the determined location of the mobile device comprises:

controlling the first location-based client to display information about a landmark associated with the determined location of the mobile device, including a placemark indicating the determined location of the mobile device overlaid on the displayed information about the landmark.

9. The method of claim **1**, where at least one of the first user interface or the second user interface is associated with a city guide client, including a number of tour guides that can be selected by a user of the mobile device.

10. The method of claim **9**, where the tour guides include at least one of a video tour guide, an audio tour guide, a slide tour guide, and a text tour guide.

11. The method of claim **1**, comprising:

presenting at least one of the first user interface or the second user interface on a touch-sensitive display of the mobile device.

12. The method of claim **11**, comprising:

modifying attributes or properties of at least one of the first user interface or the second user interface using the received information.

13. The method of claim **11**, further comprising:

presenting a map using one of the first user interface or the second user interface on the touch-sensitive display, the map including markers corresponding to businesses, services or attractions at a current location of the mobile device.

14. The method of claim **11**, where the touch-sensitive display is a multi-touch-sensitive display that is configured for processing multiple simultaneous touch points.

15. A system comprising:

a processor; and

a computer-readable medium coupled to the processor and having instructions stored thereon, which, when executed by the processor, cause the processor to perform operations comprising:

activating a first location-based client and a second location-based client for execution on a mobile device;

determining a location of the mobile device;

controlling the first and second location-based clients to concurrently display a first user interface of the first location-based client and a second user interface of the second location based client respectively;

controlling the first location-based client to display, on the first user interface of the first location-based client, visual indications associated with the determined location of the mobile device;

receiving, through the first user interface of the first location-based client, first user input selecting a first visual indication;

in response to receiving the first user input, transmitting, via a network connection, information corresponding to the selected first visual indication to a network resource;

receiving, from the network resource, information that is based on the selected first visual indication, wherein the information includes content corresponding to the first and second location-based clients; and

in response to receiving the information from the network resource:

controlling the first location-based client to update the first user interface of the first location-based client to display first content corresponding to the first location-based client that is included in the received information,

forwarding, to the second location-based client, second content corresponding to the second location-based client that is included in the received information, and

controlling the second location-based client to update the second user interface of the second location-based client to display second content corresponding to the second location-based client that is included in the received information,

wherein the first content is displayed in the first user interface concurrently with displaying the second content in the second user interface, and wherein

the format of the first content is different from the format of the second content.

16. The system of claim 15, where the first location-based client or the second location-based client includes one of: a city or tour guide client, a currency converter client, a radio client, a world clock client, a golf helper client, a directory client, a tidal watch client, a weather client, a movie/television client or a map client.

17. The system of claim 15, wherein controlling the first location-based client to display visual indications associated with the determined location of the mobile device comprises controlling the first location-based client to display a map on the first user interface of the first location-based client, the map including a placemark indicating the determined location of the mobile device, where the instructions cause the processor to perform operations further comprising:

receiving a second user input selecting the placemark;

in response to receiving the second user input selecting the placemark, presenting, on the first user interface, an input field for entering new information corresponding to the first visual indication;

receiving, through the first user interface, a third user input entering new information corresponding to the first visual indication; and

transmitting, via a network connection, the entered new information corresponding to the selected first visual indication to the network resource.

18. The system of claim 15, wherein controlling the first location-based client to display visual indications associated with the determined location of the mobile device comprises:

controlling the first location-based client to display information about a landmark associated with the determined location of the mobile device, including a placemark indicating the determined location of the mobile device overlaid on the displayed information about the landmark.

19. The system of claim 15, wherein the second user interface associated with the second location-based client is changed using the information received at the first location-based client.

20. The system of claim 15, wherein the second location-based client on the mobile device is a radio client, and wherein the information received at the first location-based client on the mobile device is used to preset local radio stations in the radio client on the mobile device.

21. The system of claim 15, wherein the second location-based client is a weather client, and wherein the information received at the first location-based client is used to provide local weather conditions in the weather client.

22. The system of claim 15, where at least one of the first user interface or the second user interface is associated with a city guide client, including a number of tour guides that can be selected by a user of the mobile device.

23. The system of claim 22, where the tour guides include at least one of a video tour guide, an audio tour guide, a slide tour guide and a text tour guide.

24. The system of claim 15, where the instructions cause the processor to perform operations comprising:

presenting at least one of the first user interface or the second user interface on a touch-sensitive display of the mobile device.

25. The system of claim 24, where the instructions cause the processor to perform operations comprising:

modifying attributes or properties of at least one of the first user interface or the second user interface using the received information.

26. The system of claim 24, where the instructions cause the processor to perform operations comprising:

presenting a map using one of the first user interface or the second user interface on the touch-sensitive display, the map including markers corresponding to businesses, services or attractions at a current location of the mobile device.

27. The system of claim 24, where the touch-sensitive display is a multi-touch-sensitive display that is configured for processing multiple simultaneous touch points.

28. A non-transitory computer-readable medium having instructions stored thereon, which, when executed by a processor, cause the processor to perform operations comprising:

activating a first location-based client and a second location-based client for execution on a mobile device;

determining a location of the mobile device;

controlling the first and second location-based clients to concurrently display a first user interface of the first location-based client and a second user interface of the second location based client respectively;

controlling the first location-based client to display, on the first user interface of the first location-based client, visual indications associated with the determined location of the mobile device;

receiving, through the first user interface of the first location-based client, first user input selecting a first visual indication;

in response to receiving the first user input, transmitting, via a network connection, information corresponding to the selected first visual indication to a network resource;

receiving, from the network resource, information that is based on the selected first visual indication, wherein the information includes content corresponding to the first and second location-based clients; and

in response to receiving the information from the network resource:

controlling the first location-based client to update the first user interface of the first location-based client to display first content corresponding to the first location-based client that is included in the received information,

forwarding, to the second location-based client, second content corresponding to the second location-based client that is included in the received information, and

controlling the second location-based client to update the second user interface of the second location-based client to display second content corresponding to the second location-based client that is included in the received information,

wherein the first content is displayed in the first user interface concurrently with displaying the second content in the second user interface, and wherein the format of the first content is different from the format of the second content.

29. The computer-readable medium of claim 28, wherein controlling the first location-based client to display visual indications associated with the determined location of the mobile device comprises controlling the first location-based client to display a map on the user interface of the first location-based client, the map including a placemark indicating the determined location of the mobile device, where the instructions cause the processor to perform operations further comprising:

receiving a second user input selecting the placemark;

in response to receiving the second user input selecting the placemark, presenting, on the first user interface, an

input field for entering new information corresponding to the first visual indication;

receiving, through the first user interface, a third user input entering new information corresponding to the first visual indication; and

transmitting, via a network connection, the entered new information corresponding to the selected first visual indication to the network resource.

30. The computer-readable medium of claim **28**, wherein controlling the first location-based client to display visual indications associated with the determined location of the mobile device comprises:

controlling the first location-based client to display information about a landmark associated with the determined location of the mobile device, including a placemark indicating the determined location of the mobile device overlaid on the displayed information about the landmark.

31. The computer-readable medium of claim **28**, wherein the second user interface associated with the second location-based client is changed using the information received at the first location-based client.

32. The computer-readable medium of claim **28**, wherein the second location-based client on the mobile device is a radio client, and wherein the information received at the first location-based client on the mobile device is used to preset local radio stations in the radio client on the mobile device.

33. The computer-readable medium of claim **28**, wherein the second location-based client is a weather client, and wherein the information received at the first location-based client is used to provide local weather conditions in the weather client.

34. The computer-readable medium of claim **28**, where the instructions cause the processor to perform operations comprising:

presenting at least one of the first user interface or the second user interface on a touch-sensitive display of the mobile device.

35. The computer-readable medium of claim **34**, where the instructions cause the processor to perform operations comprising:

presenting a map using one of the first user interface or the second user interface on the touch-sensitive display, the map including markers corresponding to businesses, services or attractions at a current location of the mobile device.

36. The computer-readable medium of claim **28**, where at least one of the first user interface or the second user interface is associated with a city guide client, including a number of tour guides that can be selected by a user of the mobile device.

37. The computer-readable medium of claim **36**, where the tour guides include at least one of a video tour guide, an audio tour guide, a slide tour guide and a text tour guide.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 9,066,199 B2
APPLICATION NO. : 12/163858
DATED : June 23, 2015
INVENTOR(S) : Scott Forstall et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

Column 14, Line 46 (Claim 1), delete "location based" and insert -- location-based --, therefor.

Column 16, Line 33 (Claim 15), delete "location based" and insert -- location-based --, therefor.

Column 18, Line 21 (Claim 28), delete "location based" and insert -- location-based --, therefor.

Signed and Sealed this
Seventeenth Day of November, 2015

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office